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THE COMPLETE EMBEDDED PC SOLUTION

COM-1460

User's Manual

ABOUT THIS MANUAL

This manual is meant for engineers and programmers who wish to develop systems based on the Eurotech COM-1460 PC/104-Plus module. It contains the module's technical specifications, and describes the connections and firmware/software.
It also describes how to install, configure and troubleshoot the COM-1460 module.

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Conventions

The following table lists conventions that are used throughout this guide.

Icon	Notice Type	Description
	Information note	Important features or instructions
	Warning	Information to alert you to potential damage to a program, system or device or potential personal injury

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Contents

Chapter 1 Product Overview

The COM-1460 is a PC/104-Plus module with 3 Firewire channels.

For a complete list of Eurotech products please go to our web site: http://www.eurotech.it/
In the following paragraphs you will find a description of the COM-1460 characteristics.

COM-1460 module's functional blocks

The figure below shows the functional blocks diagram of the module.

Figure 1.   Functional blocks of the COM-1460 module

Product Definition

COM-1460 PC/104-Plus Module characteristics

➢   PC/104-Plus Form Factor: 90 X 96 mm (3.6"X3.8"), height 15 mm (0.6")

➢   PCI/ISA compliant with the PC/104-Plus standard

➢   3 Firewire connectors

➢   1 External Power Connector

➢   Low power consumption.

➢   High reliability.

Chapter 2 Jumper Description

This chapter shows the jumpers layout and explains how to set up the jumpers.

Jumper Layout and Configuration

The figure below shows the jumper layout of the COM-1460 module.

In the figure below, the jumpers are indicated as **JP** followed by the jumper's number, while pin 1 of every three pin jumper is indicated by a red square pad.

Figure 2.   Jumpers on the COM-1460 module

The following jumpers are located on the module:

Three 2-pin jumpers which can be set as follows:

➢   pin 1 and pin 2 not connected (which will be indicated as *'Open'*)   = Open

➢   pin 1 connected to pin 2 (which will be indicated as *'Closed'*)   = Closed

Two 3-pin jumpers which can be set as follows:

➢   pin 1 connected to pin 2 (which will be indicated as *'1-2'*)   1   = 1-2

➢   pin 2 connected to pin 3 (which will be indicated as *'2-3'*)   1   = 2-3

➢   no pins connected (Open). This setting is not allowed   1   = Open

The following table provides a quick cross-reference for them.

Table 1.   Jumpers Function

JP	Type	Function			Default
JP1	3 pin jumper	Power supply for physical interface 1-2: Reserved 2-3: Power supply comes from J10			2-3
JP2	2pin jumper	GND to GND_A JP2 must be left open			Open
JP3	3 pin jumper	Setting for Bus Manager Contender (BMC) state at reset 1-2: Not Bus Manager Contender 2-3: Bus Manager Contender			1-2
JP4-JP5	2 pin jumper	JP4	JP5	Slot #*	Open - Open
		JP4 must be left open	JP5 must be left open	Put COM-1460 on the top of the stack	

⚠ *** Two jumpers (JP4 and JP5 in this case) are located on every PC/104-Plus peripheral module, and are used to set the module's Slot number. The module closest to the CPU Module starts with Slot 0. Because in the stack no more than four modules are supported (in addiction to the CPU module) the allowed values are only: 0, 1, 2 and 3. COM-1460 is normally put on the top of the stack.**
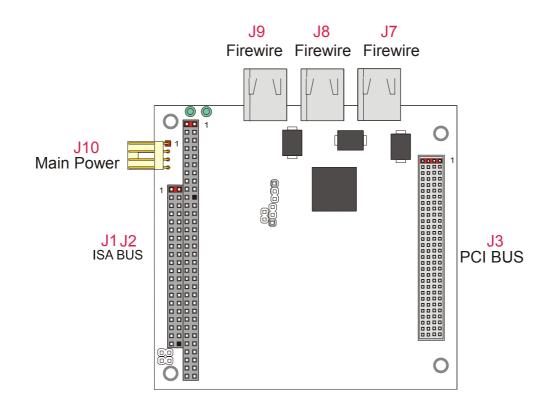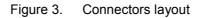
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Chapter 3   Connectors Description

This chapter provides a brief description of the COM-1460 module's connectors, with their positions and functions.

Connectors Layout

The following figure shows the connectors with their layout and describes their function.

Figure 3.   Connectors layout

⚠ **Note: in the above figure, a red square pad indicates pin 1 of each connector.**

The table below lists the name of the connectors with their function and the reference page.

Table 2.   Connector Functions

Connector	Function	Pag.
J1-J2	ISA BUS	15
J3	PCI BUS	15
J7	Firewire 1	17
J8	Firewire 2	17
J9	Firewire 3	17
J10	Main Power	17

J1, J2 for the ISA Bus and J3 for the PCI Bus

The ISA BUS

Connectors J1 and J2 carry the signals for the ISA Bus.
The ISA BUS signals are not used from the COM-1460. The only function of the ISA connector is the "passing-through" of the signals, and giving compatibility to the stack assembly.
Below is shown a picture of the ISA BUS

Figure 4.   ISA BUS layout

According to PC/104 specifications: "Key" locations - consisting of plugged holes in the upper side and omitted pins in the lower side - have been designated on each bus connector (on J1 and J2), to help assure proper connector mating."

The PCI BUS

Connector J3 carries signals of the PCI Bus. The PCI Bus mechanical interface is a stackable 30x4 header. This interface carries all of the required PCI signals per *PCI Local Bus Specification Version. 2.1.*

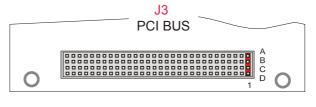In the following page is shown a picture of the PCI BUS

Figure 5.   PCI BUS layout

> **For further information about the ISA bus and the PCI bus please refer to Eurotech web site (http://www.eurotech.it/) in the section Industry Standards.**

How to connect the COM-1460 to other PC/104 & PC/104-Plus devices: the stack assembly

The ISA Bus connectors of the module are designed to allow the connection onto a stack of other PC/104 and/or PC/104-Plus devices.
We recommend you follow the procedure described below to ensure that stacking of the modules does not damage connectors or electronic parts.
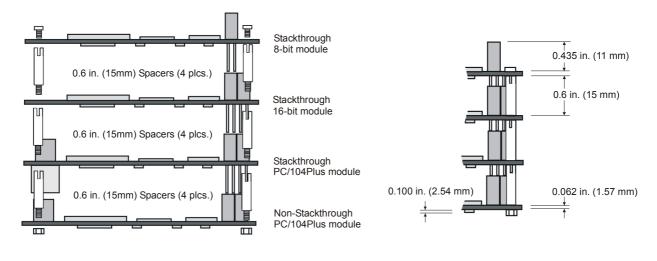
1. Turn off power to the PC/104-Plus system or stack.

2. Select and install standoffs to properly position the module on the PC/104-Plus stack.

3. Touch a grounded metal part of the rack to discharge any buildup of static electricity.

4. Remove the module from its anti-static bag.

5. Check that keying pins in the bus connector are properly positioned.

6. Check the stacking order; make sure an XT bus card will not be placed between two AT bus cards or it will interrupt the bus's signals.

7. Hold the module by its edges and orient it so that the bus connector pins line up with the matching connector on the stack.

8. Press the module evenly onto the PC/104-Plus stack.

9. Verify that all the connections are properly made
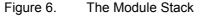
10. Switch on the power

If standard PC/104 modules are used in the stack, they must be the top module(s) because they will normally not include the PCI bus.
The following picture shows an example of a module stack with 2 PC/104-Plus modules, 1 PC/104 16-BIT module, and 1 PC/104 8-BIT module.
The maximum number of PC/104-Plus modules is 4 plus the (PC/104-Plus compliant) CPU board.
If standard PC/104 modules are used in the stack, they must be the top module(s) because they will normally not include the PCI bus.

⚠ **If the CPU is PC/104 compliant you can only stack PC/104 modules and use only the ISA buses on the Backplane. If the CPU is PC/104-Plus compliant you can stack both PC/104 and PC/104-Plus modules and use both PCI and ISA buses on the Backplane.**

Stackthrough
8-bit module

0.6 in. (15mm) Spacers (4 plcs.)

Stackthrough
16-bit module

0.6 in. (15mm) Spacers (4 plcs.)

Stackthrough
PC/104Plus module

0.6 in. (15mm) Spacers (4 plcs.)

Non-Stackthrough
PC/104Plus module

0.435 in. (11 mm)

0.6 in. (15 mm)

0.100 in. (2.54 mm)   0.062 in. (1.57 mm)

Figure 6.   The Module Stack

⚠ **Do not force the module onto the stack! Wiggling the module or applying too much pressure may damage it. If the module does not readily press into place, remove it, check for bent pins or out-of-place keying pins, and try again.**

J7, J8, J9 for Firewire

Each of the Firewire ports - compliant with the IEEE 1394 OHCI standard - is a high speed bus that supports data transfer rates up to 400Mbps (100/200/400 Mbps selectable) and delivers more than 30 times the bandwidth of the popular USB peripheral standard. Each of these ports can be used to connect up to 63 external devices, support "hot plug-and-play" and provide power supply to peripherals through an internal DC/DC converter (that is specifically used to isolate power between the physical layer and the host computer). The Firewire bus is Power Class 1.
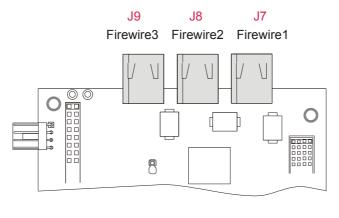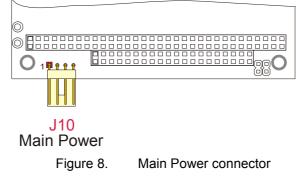

Figure 7.   Firewire ports

J10 for Main Power

J10 is a 4-pin with 2.54-mm step connector that implements the Main Power supply function.
You must provide power to the COM-1460 module before using the Firewire ports.

Figure 8.   Main Power connector

The connector pinout is given below.

Table 3.   J10 connector pinout

Pin	Signal
1	+8 - +40V
2	GND
3	GND
4	-

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Chapter 4   Troubleshooting

Many problems that you may encounter with your COM-1460 module are due to common errors such as bad (cable) connections or incorrect settings in the Setup Program.
This chapter will help you attain proper system operation.

It contains:

➢ Common problems and solutions

➢ Troubleshooting a PC/104-Plus system

➢ How to obtain technical support

➢ How to return a product

Common Problems and Solutions

The following table lists some of the common problems that you may encounter using your COM-1460 module, and suggests possible solutions. If you have problems with your COM-1460 module, please review this table *before* contacting technical support.

Table 4.   Common problems and solutions

COM-1460 Module doesn't work	
No power or wrong polarity	Check for correct power on PC/104 and PC/104-Plus bus connectors
Defective or mis-connected device on bus	Check for misaligned bus connectors, remove other cards from stack
Cable connected backwards	Verify all cables are connected properly

Troubleshooting a PC/104-Plus System

If you have reviewed the preceding table and still cannot isolate the problem with your COM-1460 module, please try the following troubleshooting steps. Even if the resulting information does not help you find the problem, it will be very helpful when contacting technical support.

➢ **Simplify the system**. Remove items one at a time and see if one particular item seems to cause the problem.

➢ **Swap components.** Try replacing items in the system one-at-a-time with similar items.

Technical/Sales Assistance

If you have a technical question, please call Eurotech Customer Support Service at one of the numbers below, or e-mail our technical support team at:

➢ mailto:techsupp@eurotech.it

➢ Phone: +39-0433-485 411

➢ Fax: +39-0433-485 499

If you have a sales question, please contact your local Eurotech Sales Representative or the Regional Sales Office for your area.

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Visit the Eurotech web site for additional and current information:

http://www.eurotech.it/

and then select the DownLoad Area

Old and new versions of manuals, application notes, patches, drivers and BIOS files can be found at:

ftp://ftp.eurotech.it/

Returning For Service

Before returning any of Eurotech's products, you must call Eurotech Technical Support at +39-0433-485411 or fill in and send (by **Fax: +39 0433 485499** or mailto:techsupp@eurotech.it) the "**Repair Order Module**" to obtain a Returned Material Authorization (**RMA**) number. The Module will be returned to you with the RMA number for enclosure with the returned products.

Note. You must have the RMA number in order to return any product for any reason!

The following information is needed to expedite the shipment of a replacement to you:

➢ Your company name and address for invoice

➢ Shipping address and phone number

➢ Product I.D. number

➢ The name of a technically qualified individual at your company familiar with the mode of failure on the board

➢ A detailed description of the problem and of the current configuration including OS and software loaded.

If the unit is out of warranty, service is available at a pre-established service charge. Contact Eurotech for pricing and please supply a purchase order number for invoicing the repair.
Pack the board in an anti-static material and ship it in a sturdy cardboard box with enough packing material to adequately cushion it.

Warning! Any product returned to Eurotech improperly packed will immediately void the warranty for that particular unit!

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Repair Order Module

For order repair or replacement of a defective Eurotech product, please complete this document.

RMA:		Don't write anything into the space to the left. Your **R**eturn **M**aterial **A**uthorization number will be assigned by Eurotech **Technical Support**

Company Name:			
Division:			
Contact Name:			
Telephone:		**Email:**	
Fax:			

Product name or model:	
Serial Number:	
O.S. Used:	

Problem description

In accordance with the Limited warranty on this product, Eurotech or its representative will, at its option, determine whether the defective product will be repaired or replaced. If the warranty has expired, or if the product does not qualify for warranty service, you will be billed a service fee.

Notes:

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Appendix

A.1   Electrical and Environmental Specifications

The following section provides tables and illustrations showing the electrical, mechanical and environmental specifications for the COM-1460 module.

In the following tables you will find:

➢ Operating Characteristics

   ▪ Electrical operating characteristics

   ▪ Operating temperature range

➢ Absolute maximum ratings

➢ MTBF

Operating Characteristics

Electrical Operating Characteristics

The board needs the following voltages to operate properly:

   ▪ PCI/104-Plus +5V

   ▪ External Power +8V - +40V (usually +12V)

Current Draw: 450mA @+5V (max)

i > **Note.** This module is not warranted against damage caused by overheating due to improper or insufficient cooling or airflow.

Operating Temperature Range

For proper operation of the module, the ambient air temperature must remain inside this range:
0°C to +60°C (+32°F to +140°F).

Absolute Maximum Ratings

Table 5.   Absolute Maximum Ratings

Supply Voltage:	Vcc: 0.00 to 7.00V
Storage Temperature Range:	-40°C to +85°C (-40°F to +185°F)
Non-Condensing Relative Humidity:	<95% at 40°C (+104°F)

The module with extended Operating Temperature Range, –40°C to +85°C (-40°F to 185°F), version is also available.

⚠ **Warning! Stressing the device beyond the "Absolute Maximum Ratings" may cause permanent damage. These are stress ratings only. Operation beyond the "Operating Conditions" is not recommended. Extended exposure beyond the "Operating Conditions" may affect device reliability.**
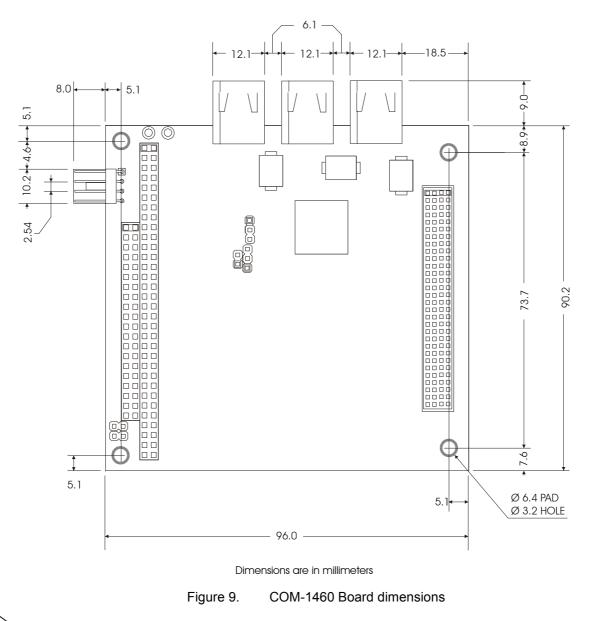
MTBF

Hours: 795110.3   **Standard:** MIL-HDBH-217   **Condition:** GB25

A.2   Mechanical Dimensions

Module Dimensions

The COM-1460 module's mechanical dimensions are shown in the following picture:

➢   Dimensions: 90 X 96 mm (3.6"X3.8"), height 15 mm (0.6")

Dimensions are in millimeters

Figure 9.   COM-1460 Board dimensions

Note: For further information about the mechanical dimensions of ISA and PCI buses please refer to the PC/104 consortium site (www.pc104.org)

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A.2   Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the equipment. Eurotech SpA assumes no liability for the customer's failure to comply with these requirements.
The safety precautions listed below represent warnings of certain dangers of which Eurotech is aware. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

Ground the Instrument

To minimize shock hazard, the equipment chassis and enclosure must be connected to an electrical ground. The equipment is supplied with a three-conductor ac power cable; the power cable must be plugged into an approved three-contact electrical outlet, with the grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electro technical Commission QEC) safety standards.

Do Not Operate in an Explosive Atmosphere

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

Keep Away From Live Circuits

Operating personnel must not remove equipment covers. Only Factory Authorized Service Personnel or other qualified maintenance personnel may remove equipment covers for internal subassembly or component replacement or any internal adjustment. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

Use Caution When Exposing or Handling the CRT

Breakage of the Cathode-Ray Tube (CRT) causes a high-velocity scattering of glass fragments (implosion). To prevent CRT implosion, avoid rough handling or jarring of the equipment. Only qualified maintenance personnel using approved safety mask and gloves should handle the CRT.

Do Not Substitute Parts or Modify Equipment

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification of the equipment. Contact Eurotech technical staff or your local representative for service and repair to ensure that safety features are maintained.

Observe Dangerous Procedure Warnings

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed. You should also employ all other safety precautions, which you deem necessary for the operation of the equipment in your operating environment.

Flammability

All Eurotech PWBs (printed wiring boards) are manufactured by UL-recognized manufacturers, with a flammability rating of UL-V0.

EMI Caution

This equipment generates, uses and can radiate electromagnetic energy. It may cause or be susceptible to electromagnetic interference (EMI) if not installed and used in a cabinet with adequate EMI protection.

CE Notice

This product complies with the EMC Directive (89/336/EEC). Compliance with this directive implies conformity to the following European Norms:

> ➢ EN55022 (CISPR 22) Radio Frequency Interference

> ➢ EN50082-1 (IEC801-2, IEC801-3, IEC801-4) Electromagnetic Immunity

The product also fulfills EN60950 (product safety), which is essentially the requirement for the Low Voltage Directive (73/23/EEC).
This product was tested in a representative system to show compliance with the above-mentioned requirements. A proper installation in a CE-marked system will maintain the required EMC/safety performance.

Disclaimer of Warranty

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Reliability

Eurotech has taken extra care of product design in order to ensure reliability. The two major ways in which reliability is achieved are:

> ➢ The product is designed in top-down method, utilizing the latest in hardware and software techniques, so unwanted side effects and improper interactions between parts of the system are eliminated.

> ➢ Eurotech tests each board by exercising its functions, burns it in under power, and retests it to ensure that the infant mortality phase is passed before the product is shipped.

Life Support Policy

Eurotech products are not authorized for use as critical components in life support devices or systems without the express written approval of the president of Eurotech S.p.A.

Glossary

A

ATA

Advanced **T**echnology **A**ttachment, is a disk drive implementation integrating the controller on the disk drive. There are several versions of ATA:

- **ATA:** Known also as IDE, supports one or two hard drives, a 16-bit interface and PIO modes 0, 1 and 2.

- **ATA-2:** Supports faster PIO modes (3 and 4) and multiword DMA modes (1 and 2). Also supports Logical Block Addressing (LBA) and block transfers. ATA-2 is marketed as Fast ATA and Enhanced IDE (EIDE).

- **ATA-3:** Minor revision to ATA-2.

- **Ultra-ATA:** Also called Ultra-DMA, ATA-33, and DMA-33, supports multiword DMA mode 3 running at 33 MBps.

- **ATA/66:** A new version of ATA, that will double ATA's throughput to 66 MBps

ATAPI

Short for **AT A**ttachment **P**acket **I**nterface, an extension to EIDE that enables the interface to support CD-ROM players

B

BIOS

Basic I/O system. A set of routines that works closely with the hardware to support the transfer of information between elements of the system, such as memory, disks, and the monitor. Although critical to performance, the BIOS is usually invisible to the end user; however, programmers can access it.

C

CPU
CPU (Central Processing Unit) is the heart (computational and control unit) of a computer.
This device interprets and executes instructions.

CVBS
CVBS Composite Video Broadcasting Signal

D

DMA
The Direct Memory Access is a technique for transferring data from the memory to a device. Data doesn't pass through the CPU.

DEVICE
It is any circuit performing a specific function.

E

ECP
Extended Capabilities Port. An asynchronous, 8-bit–wide parallel channel defined by IEEE 1284-1944 that provides PC-to-peripheral and peripheral-to-PC data transfers.

EEPROM
EEPROM (also known as E^2PROM) stands for Electronic Erasable Programmable ROM.
This type of memory can be re-programmed by electronic signals.

EPROM
EPROM stands for Erasable Programmable ROM.
This type of memory can only be erased by ultra-violet (UV) light.

ETHERNET
It is a type of Local Area Network (LAN) architecture. Ethernet supports data transfer rates of 10Mbps.
A newer version of Ethernet, called Fast Ethernet (or 100Base-T), supports data transfer rates of 100 Mbps.
And the newest version, Gigabit Ethernet supports data rates of 1 Gbit (1000 megabits) per second.

F

FDC
Floppy Disk Controller. A special-purpose chip and associated circuitry that directs and controls reading from and writing to a computer's disk drive.

FIFO
First in/first out. A method for processing a queue in which items are removed in the same order in which they were added.

Flash ROM
Flash ROM (like EEPROM) can be re-programmed by electronic signals. Usually a Flash ROM has a capacity of 1MB.Into this memory usually resides BIOS and other useful programs or instructions.

Firewire
Firewire is a high speed bus that supports data transfer rates up to 400Mbps (100/200/400 Mbps selectable) and delivers more than 30 times the bandwidth of the popular USB peripheral standard.

H

HDC
Hard Disk Controller is a special-purpose chip and circuitry that directs and controls reading from and writing to a computer's disk drive.

I

IDE
Integrated Device Electronics is a disk drive interface where the controller electronics reside on the drive itself. This allows elimination of the need for a separate adapter card.

IEEE
IEEE stands for Institute of Electrical and Electronics Engineers, pronounced "I-triple-E." Founded in 1963, IEEE is an organization composed of engineers, scientists, and students. IEEE is best known for developing standards for the computer and electronics industry.

I/O
I/O (Input/output). Two of the three activities that characterize a computer (input, processing, and output). Refers to the complementary tasks of gathering data for the microprocessor to work with and making the results available to the user through a device such as the display, disk drive, or printer.

IRQ
IRQ (Interrupt ReQuest). A method by which a device can request to be serviced by the device's software driver. The system board uses a PIC to monitor the priority of the requests from all devices. When a request occurs, a microprocessor suspends the current operation and gives control to the device driver associated with the interrupt.

ISA
ISA (Industry Standard Architecture) is an 8-bit / 16-bit bus that provides a buffered interface from devices on expansion cards to the PC internal bus.

L

LAN
LAN (Local Area Network). A group of computers and other devices spanned over a relatively limited area (i.e. a single building).

LBA
LBA (Logical Block Address). A unit of data supplied or requested by a host computer.

M

MIDI
MIDI (Musical Instrument Digital Interface). An industry-standard connection for computer control of musical instruments and devices. A hardware and data standard for communicating between hardware. Most

references involve only the data standard, which is a byte stream used for controlling musical instruments and storing the output of such instruments.

MPEG
MPEG (Moving Picture Expert Group). Refers to one of several standard video-compression schemes. A CODEC for squeezing full-screen, VHS-quality digital video into a small data stream so that it can be played from a CD-ROM drive.

N

NDIS
NDIS (Network Driver Interface Specification). The interface for network drivers used in Windows and Windows NT operating systems. NDIS provides a common mechanism by which any given NDIS-compatible transport driver can communicate with any NDIS-compatible network adapter driver. Moreover, it provides for multiple transports to work over multiple network adapters by supporting multiplexing between transports and drivers.

NMI
NMI (Nonmaskable Interrupt). An interrupt that cannot be overruled by another service request. A hardware interrupt is called nonmaskable if it cannot be masked by the processor interrupt flag.

NTSC
NTSC (National Television System Committee) of the Electronics Industries Association (EIA). The standards-setting body for television and video in the United States. Sponsor of the NTSC standard for encoding colour, a coding system compatible with black-and-white signals and the first system used for colour broadcasting in the United States. The broadcast standard for the United States and Japan. *See also* PAL format *and* SECAM.

O

OEM
OEM stands for Original Equipment Manufacturer. This acronym is used primarily to refer to PC systems manufacturers.

P

PCI
PCI (Peripheral Component Interconnect) is a standard high-performance, 32-bit / 64-bit bus, designed to be used with devices that have high bandwidth requirements.

PCMCIA
PCMCIA (Personal Computer Memory Card International Association). Sometimes used to refer to a controller for a type of expansion card documented in the PCMCIA standards.

PIO
The Programmed Input/Output is a method of transferring data over the IDE interface. The other way is the Direct Memory Access (DMA)

R

RAM
RAM (Random Access Memory). Semiconductor-based memory that can be read-from and written-to by the microprocessor or other hardware devices.

ROM
ROM stands for Read Only Memory. This memory can only be read-from but not written-to.

S

SCSI
SCSI stands for Small Computer System Interface. It is an I/O bus designed as a method for connecting several classes of peripherals to a host system without requiring modifications to generic hardware and software.

SECAM
SECAM (Sequential Couleur a Memoire; Sequential Colour with Memory). The television standard for France, Russia, and most of Eastern Europe. As with PAL, SECAM is based on a 50-Hz power system, but it uses a different encoding process and displays 819 horizontal lines per frame at a scan rate of 25 frames per second (50 fields per second). *See also* NTSC *and* PAL format.

SMBus
SMBus (System Management Bus). A two-wire interface based on the I²C protocol. The SMBus is a low-speed bus that provides positive addressing for devices, as well as bus arbitration.

SSD
SSD stands for Solid State Disk (i.e. Disk on Chip, Disk on Module, Flash ROM,).
In fact this is not a real disk but a silicon support memory without mechanical parts that are in movement.

U

UART
UART (Universal Asynchronous Receiver/Transmitter), is a module composed of a circuit that contains both the receiving and transmitting circuits required for asynchronous serial communication.

USB
USB (Universal Serial Bus) is a 4-pin bi-directional, isochronous, dynamically attachable serial peripheral bus that is capable of cascading low/medium speed peripherals (less than 10 Mbit/s)

V

VGA
VGA Video graphics array. A video adapter that supports 640 × 480-pixel colour resolution. A video display standard for boot devices under Windows operating systems.

W

WAN
WAN stands for a wide-area network and it is a system of LANs (in geographically separated areas) connected together via telephone lines and/or radio waves.

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Acronyms and Abbreviations

APM	Advanced Power Management	LPT	Line Printer
ATA	AT Attachment	LVD	Low Voltage Differential
ATAPI	ATA Packet Interface	MB	Megabyte
BIOS	Basic I/O System	Mbps	Megabits per second
CVBS	Composite Video Broadcasting Signal	MHZ	Megahertz
DMA	Direct Memory Access	MPEG	Moving Picture Expert Group
ECC	Error Correction Code	NIDS	Network Driver Interface Specification
ECP	Enhanced Capabilities Port	NTSC	National Television System Committee
FDC	Floppy Disk Drive Controller	OEM	Original Equipment Manufacturer
FDD	Floppy Disk Drive	PAL	Phase Alternation Line
HDC	Hard Disk Drive controller	PCI	Peripheral Component Interconnect
HDD	Hard Disk Drive	PCMCIA	Personal Computer Memory Card International Association
IDE	Integrated Device Electronics		
IEEE	Institute for Electrical and Electronics Engineers, Inc.	PIC	Programmable Interrupt Controller
		PIO	Programmed I/O
I/O	Input/Output	POST	Power-On Self Test
IP	Internet Protocol	RAM	Random Access Memory
IRQ	Interrupt Request	RAMDAC	RAM digital-to-analog converter
ISA	Industry Standard Architecture	SCSI	Small Computer System Interface
KB	Kilobyte	SMBus	System Management Bus
Kbps	Kilobits per Second	TCP/IP	Transmission Control Provocol/Internet Protocol
KHz	Kilohertz		
LAN	Local Area Network	USB	Universal Serial Bus
LBA	Logical Block Addressing	V	Volts
LCD	Liquid Crystal Display	WAN	Wide Area Network

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